

APPENDIX E  
**WHITE PAPER  
ON  
FREQUENCY (RADIO SPECTRUM) MANAGEMENT**

ISSUE: Both international and domestic spectrum policy are of critical importance to the Federal meteorological community and can significantly impact our ability to carry out our assigned duties and responsibilities.

BACKGROUND:

- ▶ Meteorological satellites (metsat) and/or meteorological (met) aids have global allocations in a number of bands; for example, 137-138 MHz, 400.15-406 MHz, and 1688.4-1710 MHz.
- ▶ There is an increasing demand for radio spectrum; e.g., satellite systems, cellular phones, and personal communications systems, in the commercial marketplace.
- ▶ Radio spectrum is viewed as a "cash cow" to be milked to add dollars to the Federal coffers.
  - ▶▶ First implemented in the 1993 Omnibus Budget Reconciliation Act (OBRA-93), which mandated that a minimum of 200 MHz of Federal radio spectrum be auctioned to the highest bidder. In fact, a total of 235 MHz was offered up.
  - ▶▶ One impact--OBRA-93 required that radiosondes stop using the 1670-1675 MHz met aids band by 1999. The National Weather Service, which operates most of its radiosonde systems in the 1670-1700 MHz band, however, was not given the money by Congress to make the necessary equipment modifications to fulfill this requirement. As a result, the band will not be available on schedule for commercial use.
  - ▶▶ The Balanced Budget Act of 1997 mandated the transfer of an additional 20 MHz to the auction block--this time the meteorological community was spared.
- ▶ Internationally, the meteorological community holds spectrum which is very desirable to certain classes of commercial systems, particularly those which plan global deployment. An example is the Mobile Satellite Service (MSS), which has grown from nothing to a major threat in just a few years.
- ▶ At the 1997 World Radio Conference (WRC-97), NOAA and the meteorological community took both a proactive and defensive stance.
  - ▶▶ Proactive in the sense that new allocation requests were planned for metsat passive sensing; data downlinks; Telecommand, Telemetry, and Control; and worldwide deployment of wind profilers. An upgraded allocation for metsats in 401-403 MHz was also planned.
  - ▶▶ On the other hand, the community was ready to defend its current global allocations for metsats and met aids.

CURRENT STATUS:

- ▶ Wind profilers. Implemented as footnotes to the allocation table either authorizing non-radar bands to be used for wind profilers or recommending profiler use in suitable parts of existing radar bands near 50 MHz, near 400 MHz, and near 1000 MHz.
- ▶ 136-137 MHz. Currently used for automatic picture transmission (APT) downlinks from NOAA's polar-orbiting satellites verging on extinction. Downlinks from future metsats are being shifted to 137-138 MHz. WRC-97 revised the allocation table to remove the secondary allocation for these systems, but a footnote states that these services will remain available through 2002.

- ▶ 137-138 MHz. The allocation table for this band was modified by the 1992 World Administrative Radio Conference (WARC, now the WRC), and both primary and secondary allocations for MSS were added with those for metsats, creating a new, commercial "sharing partner" arrangement. WRC-95 saw efforts to expand the use of the band by MSS at the expense of the meteorological community. While this attempt was defeated, we should expect the issue to surface again.

- ▶ 401-406 MHz. After failing to get MSS into this band at WRC-95, the U.S. proposed to add MSS allocations primary from 405-406 MHz and secondary from 402-405 MHz at WRC-97. While the proposal again failed, the National Telecommunications and Information Agency (NTIA) and the Federal Commerce Commission (FCC) remain determined to create a Little LEO (low-earth orbiting) allocation in 401-406 MHz. In fact, the NTIA has blocked new meteorological systems in the 405-406 MHz band because it plans a transfer to commercial use.

- ▶ 1670-1710 MHz. While the actual allocation begins at 1668.4 MHz, an existing allocation to radio astronomy has made the region below 1670 MHz unavailable to met aids in parts of the world.

- ▶▶ Metsat ground stations, which control the satellites and downlink the data collected, operate primarily below 1675 MHz. Polar orbiters also transmit High Resolution Picture Transmission (HRPT) in the band segment 1697-1710 MHz.

- ▶▶ User data (GOES Variable (GVAR) and Weather Facsimile (WEFAX)) broadcast from geostationary satellites are downlinked in the band from roughly 1683-1697 MHz.

- ▶▶ The MSS industry continues to press for access to the band. However, a proposal to couple MSS access to one of the Global Positioning System (GPS) bands (for downlinks) with 1675-1683 MHz (for MSS uplinks) produced a major U.S. reaction to protect the GPS band. As a result, the met band was protected by association.

- ▶▶ Studies have shown that both MSS and metsat downlinks are incompatible with the existing radiosondes that operate in the 1675-1683 MHz band, and, similarly, squeezing radiosondes above 1683 MHz would cause harmful interference to existing metsat downlinks.

- ▶ New allocations. To accommodate new sensors, WRC-97 approved a new metsat downlink allocation at 7750-7850 MHz for non-geostationary satellites and a new limitation on the existing 7450-7550 MHz downlink band for geostationary satellites only. WRC-97 also rearranged certain bands in the vicinity of 60 GHz to make them useful for passive sensing by metsats and approved an allocation for active sensing, but for cloud sensing only, by metsats at 94-94.1 GHz.

## CONCLUSIONS AND RECOMMENDATIONS:

- ▶ Commercial industry, particularly the MSS industry, will remain vigilant in its pursuit of radio spectrum. There is no firm resolve in the U.S. to protect the 1670-1710 MHz met band; for example, part of it could be sacrificed to protect GPS.

- ▶ The Federal meteorological community must capitalize on state-of-the-art technology to make the most efficient and effective use of the radio spectrum allocated for our use.

- ▶ With the help of the Department of Commerce Office of Radio Frequency Management (ORFM) and the OFCM, we must be knowledgeable of proposed changes to international and domestic frequency management policy that will impact the Federal meteorological community--visit ORFM's web site regularly at [www.orfm.noaa.gov](http://www.orfm.noaa.gov).

- ▶ We must be prepared to defend our requirements for radio spectrum and, as technology allows, the Federal meteorological community must identify the radio spectrum that's within our allocation but over and above our requirements.

- ▶ And probably the most challenging task--we must find a way to collaborate with the commercial users of weather data, like agriculture, transportation, public safety, and many others, in both a national and international lobbying effort to protect the met bands.